

PROJECT REPORT ON
Cauliflower under Greenhouse



SUBMITTED BY

Promoter Name:

XXXXXXXXXXXXXXXXXXXX

Project Location:

XXXXXXXXXXXXXXXXXXXX

Prepared By:

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1187/67, Ground Floor, Gruhalaxmi,
J.M. Road, near Balgandharva Chowk,
Pune, Maharashtra 411005.

C O N T E N T S

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CHAPTER - I

ABOUT THE PROMOTER

1. Name of Firm : xxxxxxxxxxxx
2. Name of Promoter : xxxxxxxxxxxx
3. Address(Residence) : xxxxxxxxxxxx
4. Contact Number : xxxxxxxxxxxx
5. Project Location (Addr.) : xxxxxxxxxxxx

CHAPTER – II

PROJECT DESCRIPTION

Varieties

Hills

Ooty 1, Pusa Dapoli, Cuba Giant, Snow ball, Second early, Early kunwar and Second early kunwar are the popular cultivars.



Ooty 1

Plains

Early Synthetic, Pawas, NS131, Tropi cross Marval, Patna mid season and Arka kanti are the popular cultivars.

Soil

It requires cool moist climate. The early varieties may tolerate higher temperature and long days. This can be grown in plains during September to February. Deep loamy soils with a pH range of 5.5 to 6.6 with higher organic matter content and good drainage are suited for cauliflower cultivation.

Seed rate

375 g/ha seeds are required.

Nursery

100 sq. m nursery area is sufficient for raising one hectare. Apply FYM at 300 kg and 10 kg of No.5 mixture (9:9:9) along with 50 g of Sodium molybdate and 100 g of Borax. Sow the seeds at 10 cm between rows in raised seed beds after drenching it with Copper oxychloride (2.5 g/lit). Transplant 30 to 40 days old seedlings at a spacing of 45 cm. Avoid land infected with 'club root disease'.

Protected nursery

Raise the seedlings in shade net house. A nursery area of 5 cents with slanting slope of 2% is required for the production of seedlings for 1 ha. Cover the nursery area with 50 per cent shade net and the sides with 40/50 mesh insect proof nylon net. Form the raised beds of 1m width and convenient length inside the nursery and above the beds, place the protrays.

Protray

The Protrays of 98 cells are ideal for cauliflower seedling production. Around 600 protrays are required for of 28,333 seedlings required for one hectare at a spacing of 60 x 45 x 45 cm in three row planting

Growing medium

The sterilized cocopeat @ 720kg / ha is mixed with 10kg of neem cake and Azospirillum and Phosphobacteria each @ 1kg. About 1.25 kg of the cocopeat medium is required for each tray.

Seed treatment

250 g of hybrid cauliflower seed is required for the production of seedlings for 1 ha. Treat the seeds in hot water @ 50°C for 30 minutes. 25g of Azospirillum is required for the seed treatment of 250g cauliflower seeds.

Sowing

Sow the seeds in protrays @ 1 seed per cell. Cover the seeds with cocopeat, keep the tray one over the other (8-10Nos) and cover with polythene sheet for 5 days or till germination starts. After 5 days when the seeds are germinated, arrange the protrays on the raised beds inside the shade net nursery. Water the tray by rose can everyday (twice / day) and drench with 19:19:19 + MN @ 0.5 % (5g/l) solution using rose can or spray micronutrient at 0.5 % 18 days after sowing. The cauliflower seedlings are ready for transplanting in 25 day

Preparation of field

Bring the soil to fine tilth and pits should be taken at a spacing of 45 cm either way in hills. Form ridges and furrows at 60 cm in plains.

Planting

Sow the seeds in raised beds and transplant 25 days (early varieties), 45 days old seedlings (late varieties) at 45 cm apart.

Irrigation

Hills

Irrigation is done once in a week during January and February.

Plains

Irrigation is done once in a week.

Drip irrigation

Install drip system with main and sub-main and the inline laterals placed at the interval of 1.5 m. Place the drippers at the interval of 60 cm for 4 LPH or 50 cm for 3.5 LPH, in the lateral system. Form the raised beds at 120 cm width at an interval of 30cm and place the laterals at the centre of each bed.

Application of fertilizers

Hills

Apply 30 t/ha of FYM and 90 kg N, 90 kg P and 90 kg K as basal dose and 45:45:45 kg NPK/ha after 45 days.

Plains

Apply 15 t of FYM/ha and 50 kg N, 100 kg P and 50 kg K as basal and 50 kg N after 45 days. Apply 2 kg of Departmental Vegetable micronutrient mixture without mixing with the chemical fertilizers.

Fertigation

Fertigation requirement for F1 hybrid: 200: 125: 125 kg of NPK / ha. Apply once in every three days throughout the cropping period.

Spacing: 60x 45x45cm in paired row system

Fertigation schedule

Recommended Dose: 200:125:125 kg/ha

| Stage | Crop stage | Duration in days | Fertilizer grade | Total fertilizer (kg/ha) | Nutrient supplied | | | % requirement | | |
|-------|--------------------------------------|------------------|------------------|--------------------------|-------------------|--------|--------|---------------|-------|-------|
| | | | | | N | P | K | N | P | K |
| 1 | Transplanting to plant establishment | 10 | 19:19:19 + MN | 62.66 | 11.906 | 11.906 | 11.906 | 10.00 | 9.70 | 12.00 |
| | | | 13-0-45 | 7.33 | 0.953 | - | 3.300 | | | |
| | | | Urea (46% N) | 15.33 | 7.866 | - | - | | | |
| | | | Subtotal | 85.333 | 19.913 | 11.906 | 15.206 | | | |
| 2 | Curd initiation stage | 25 | 13-0-45 | 111.333 | 14.473 | - | 50.100 | 56.00 | 15.30 | 40.00 |
| | | | 12-61-0 | 31.333 | 3.760 | 19.113 | - | | | |
| | | | Urea (46% N) | 204.00 | 93.84 | - | - | | | |
| | | | Subtotal | 346.666 | 112.073 | 19.113 | 50.100 | | | |
| 3 | Curd development stage | 35 | Urea (46 % N) | 148.00 | 68.08 | - | - | 34.00 | - | 48.00 |
| | | | 0-0-50 | 120.666 | | | | | | |
| | | | Subtotal | 268.666 | 68.080 | - | 60.333 | | | |
| | Total duration | 70 | | Total | 200.06 | 31.019 | 125.63 | 100 | 25 | 100 |

75% of RD of P applied as superphosphate = 586 kg/ha

1. 19: 19: 19+MN = 63 kg
2. 13: 0: 45 = 119 kg
3. Urea = 368 kg
4. 0-0-50 = 121 kg
5. 12:61:0 = 32 kg

After cultivation

Gap filling is done after 20 days of planting to maintain the population and uniform growth. Hoeing and weeding can be done on 30th and 45th day of planting. Avoid deep hoeing as it is a shallow rooted crop.

Plant protection

Pests

Cut Worms

Set up light trap in summer months. Spray Chlorpyrifos 2 ml/lit in the collar region during evening hours.

Aphids

Install yellow sticky trap @ 12 no/ha to monitor Macropterous adults (winged adult). Apply phorate 10 % G @ 20 kg /ha or spray neem oil 3 % with 0.5ml teepol/lit or spray any one of the following insecticide

| Insecticide | Dose |
|--|---------------|
| Azadirachtin 5% Neem Extract Concentrate | 5.0 ml/10 lit |
| Dimethoate 30 % EC | 7.0ml/10 lit |

Diamond backmoth

1. Grow mustard as intercrop at 20:1 ratio.
2. Install pheromone traps @ 12 No/ha.
3. Release larval parasite *Diadegma semiclausum* @ 50,000/ ha, 60 days after planting
4. Spray NSKE 5 % or cartap hydrochloride @ 1 g/lit or *Bacillus thuringiensis* @ 1g/lit at primordial stage (ETL 2 larvae/plant) or any of the following insecticides

| Insecticide | Dose |
|--|---------------|
| Azadirachtin 5% Neem Extract Concentrate | 5.0 ml/10 lit |
| Lufenuron 5.4 % EC | 1.2 ml/lit. |
| Spinosad 2.5 % SC | 1.2 ml/lit. |
| Trichlorofon 50 % EC | 1.0 ml/lit. |

Diseases

Club root

Biological control

Seed treatment with *Pseudomonas fluorescens* at 10 g/ kg of seeds, followed by seedling dip @ 5g/ l and soil application @ 2.5 kg/ha along with 50 kg FYM before planting

Chemical control

Dip the seedlings in Carbendazim solution 2 g/l for 20 minutes. Drench the soil around the seedlings in the main field with Carbendazim @ 1 g/l of water. Follow crop rotation. Crucifers should be avoided for three years.

Leaf Spot

Leaf spot can be controlled by spraying Mancozeb at 2 g/lit or Carbendazim 1 g/lit.

Leaf Blight

Leaf blight can be controlled by spraying Mancozeb @ 2.5 g/ litre.

Blanching

Blanching refers to covering of curds. A perfect curd of flower is pure white. It is necessary to exclude sunlight to obtain this. The common practice is to bring the outer leaves up over the curd and tie them with a twine or rubber band. By using a different coloured twine each day. It is easy at the time of harvest to select those tied earlier.

Physiological disorders

Browning or brown rot

This is caused by Boron deficiency. It appears as water soaked areas and later changes into rusty brown. Spray one kg of Borax in 500 lit of water 30 days after planting.

Whip tail This results from the deficiency of Molybdenum. It is more pronounced in acidic soil. The leaf blades do not develop properly. In severe cases only the midrib develops and it can be corrected by spraying 100 g of Sodium molybdate in 500 lit of water 30 days after planting.

Buttoning The term buttoning is applied to the development of small curds or buttons. The plants do not develop normally and leaves remain small and do not cover the developing curds. Deficiency of Nitrogen and planting the early varieties late may cause these symptoms. Avoid transplanting aged seedlings.

Blindness Blind-cauliflower plants are those without terminal buds. The leaves are large, thick, leathery and dark green. It is due to the prevalence of low temperature when the plants are young or due to damage to the terminal bud during handling the plants or due to injury by pests.

CHAPTER – III

MARKET POTENTIAL

Marketing of Cauliflower is the crucial factor for the success of the project. There is tremendous potential for cultivating Cauliflower through poly houses. In India, Cauliflower is grown for its mature fruits and is widely used as salad. It has attained a status of high value crop in India in the recent years and occupies a pride place among vegetables in Indian cuisine, because of its delicate taste and rich content of ascorbic acid and other vitamins and minerals.

Cauliflower consumption in India is increasing now-a-days due to increasing demand by urban consumers. There is a good demand for export too. The export market needs fruits with longer shelf life, medium size, tetra lobed fruits with an attractive dark colour, mild pungency and good taste. But, the supply is inadequate due to low productivity of the crop. But there is increased demand for Cauliflower by the consumers and lot of farmers are also showing interest in the cultivation of this crop under protected conditions, as this type is having definite qualitative and quantitative advantage over the traditional cultivation.

CHAPTER – IV

SWOT ANALYSIS

Strengths:

- Domestic market for Cauliflower is growing.
- The Governments have identified vegetables in polyhouse as a sunrise sector and are providing strong support through various policies and schemes.

WEAKNESS:

- High capital investment
- Demand fluctuate according to different seasons
- Unavailability of skilled manpower
- Incidence of pest and diseases many a times becomes unmanageable.
- Poor marketing linkage and poor market infrastructure.
- Non-availability of adequate quality planting material.
- Poor post-harvest management infrastructure. Due to the perishable nature of the products it's important to have enough transportation and good logistics facilities.
- Negligence to research relating to technical factors

OPPORTUNITY:

- There is tremendous demand for Cauliflower due to the growing popularity of western life style
- Access to metropolises like Kolkata, Chennai, Mumbai and Delhi etc. and other big cities enhances the possibilities for tapping market of these states.
- Growing consumer base with higher income is expected to add demand in new market
- Availability of new and unique varieties

THREATS:

- Uncertainty in weather conditions and frequent occurrence of natural calamities like cyclone and drought.
- Uncertainty about market stability
- Exploitation by middlemen in the market chain.
- High incidence of pest and diseases.

V. ECONOMICS OF THE PROJECT

A. PROJECT PROFILE (Financial)

| Sr. No. | PARAMETERS | VALUE |
|---------|-----------------------------|-------------|
| 1 | Unit Size in sq.m. | 20,000 |
| 2 | Product | Cauliflower |
| 3 | Cost of the project | 2,05,35,500 |
| 4 | Bank loan | 1,54,01,625 |
| 5 | Margin money | 51,33,875 |
| 6 | Financial Indicators | |
| | BCR at 15% DF | 1.86 :1 |
| | NPW at 15% DF Rs. | 1,73,06,104 |
| | I R R % | 55 |
| 7 | Average DSCR | 2.8 |
| 8 | Interest Rate (% per annum) | 12 |
| 9 | Repayment | 5 years |

B. BASIS & PRESUMPTIONS

| Sr. No. | Particular | Unit | Quantity |
|---------|------------|------|----------|
|---------|------------|------|----------|

I. Techno-economic parameters

| | | | |
|-----------------|---|--|---------|
| Payback period | | | 5 years |
| Rate of interst | % | | 12 |

II. Expenditure norms

| | | | |
|--|------------|--|--------|
| Fertilizer per annum | Rs./ Sq.m. | | 5 |
| Pesticides per annum | Rs./ Sq.m. | | 5 |
| No of semiskilled workers | Nos. | | 2 |
| Cost of one semiskilled worker per annum | Rs. | | 72,000 |

II. Income norms

| | | | |
|-----------------------------------|--------|--|----|
| Sale price of Cauliflower | Rs./Kg | | 30 |
| Yield per 4000 sqm per crop cycle | Tonn | | 20 |
| Crop cycles per pear | | | 3 |

Subsidy receives @ 50% from N.H.B. treated as F.D. in bank @ 6%

This amount of subsidy is used for repayment of loan

C. TOTAL COST OF PROJECT

| Sr. No. | Particular | Unit | Unit Rate in Rs. | Quantity | Amount in Rs. |
|--|--------------------------------|-----------|---------------------|----------|--------------------|
| I. Cost of Polyhouse | | | | | |
| | | Sq.m. | 800 | 20,000 | 1,60,00,000 |
| II. Initial Planting cost | | | | | |
| | Bed material & preparation | Rs./sq.m. | 50 | 20,000 | 10,00,000 |
| | Fertilizers & mannures | Rs./sq.m. | 5 | 20,000 | 1,00,000 |
| | Manpower & supervision | Rs./sq.m. | 50 | 20,000 | 10,00,000 |
| | Irrigation system (with drip) | Rs./sq.m. | 100 | 20,000 | 20,00,000 |
| | | | | | 41,00,000 |
| III. Cost of grading/pack house | | | | | |
| | | Sq. ft. | 650 | 670 | 4,35,500 |
| TOTAL | | | | | 2,05,35,500 |

D. MEANS OF FINANCE

| Sr. No. | Particular | Unit | Quantity | Amount in Rs. |
|---------|------------------------------------|------|----------|--------------------|
| 1 | Term loan | % | 75 | 1,54,01,625 |
| 2 | Own contribution | % | 25 | 51,33,875 |
| TOTAL | | | | <u>2,05,35,500</u> |
| 3 | Subsidy entitlement @ 50% from NHB | | | 1,02,67,750 |

E. PROJECTION OF PERFORMANCE & PROFITABILITY

| Sr. No. | Particular | Unit | Unit rate in Rs. | Quantity | I year | II year | III year | IV year | V year |
|------------------------|--|-----------|---------------------|--------------------|------------------|------------------|------------------|------------------|--------------------|
| I. Income | | | | | | | | | |
| a. | Sale of Cauliflower | | | | | | | | |
| | Yield per crop cycle | Tonn | | | 100 | 100 | 100 | 100 | 100 |
| | Total yield per annum (Crop cycles per annum- 3) | Tonn | | | 300 | 300 | 300 | 300 | 300 |
| | Selling price | Rs./kg | | | 30 | 30 | 30 | 30 | 30 |
| | Total Income | Rs. | | | 90,00,000 | 90,00,000 | 90,00,000 | 90,00,000 | 90,00,000 |
| b. | Interest on Subsidy @ 6% | | | | 6,16,065 | 6,16,065 | 6,16,065 | 6,16,065 | 6,16,065 |
| c. | Subsidy | | | | 0 | 0 | 0 | 0 | 1,02,67,750 |
| | TOTAL (B) | | | | 96,16,065 | 96,16,065 | 96,16,065 | 96,16,065 | 1,98,83,815 |
| II. Expenditure | | | | | | | | | |
| a. | Cost of Raw Materials | | | | | | | | |
| | Planting material for 3 crop cycle | per sq.m. | 10 | 20,000 | 2,00,000 | 2,00,000 | 2,00,000 | 2,00,000 | 2,00,000 |
| | Fertilisers | per sq.m. | 5 | 20,000 | 1,00,000 | 1,00,000 | 1,00,000 | 1,00,000 | 1,00,000 |
| | Pesticides & fungicides | per sq.m. | 5 | 20,000 | 1,00,000 | 1,00,000 | 1,00,000 | 1,00,000 | 1,00,000 |
| b. | Cost of Consumbles | | | | | | | | |
| | Packaging material | per kg | 0.50 | 300 | 150 | 150 | 150 | 150 | 150 |
| c. | Cost of Utilities | | | | | | | | |
| | Electricity, Water | per month | 2,500 | 12 | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| d. | Cost of Manpower | | | | | | | | |
| | Semiskilled workers | per annum | 72,000 | 2 | 1,44,000 | 1,44,000 | 1,44,000 | 1,44,000 | 1,44,000 |
| e. | Overhead Expenses | | | | | | | | |
| | Transportation | per month | 1000 | 12 | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| | Marketing expenses 1% of sales | | | | 90,000 | 90,000 | 90,000 | 90,000 | 90,000 |
| | TOTAL (A) | | | | 6,76,150 | 6,76,150 | 6,76,150 | 6,76,150 | 6,76,150 |
| III Net Income | | | | TOTAL (A+B) | 89,39,915 | 89,39,915 | 89,39,915 | 89,39,915 | 1,92,07,665 |

F. Financial Analysis

| Particulars | I year | II year | III year | IV year | V year |
|---|---------------------|------------------|------------------|------------------|--------------------|
| Capital Costs | 2,05,35,500 | | | | |
| Recurring cost | 6,76,150 | 6,76,150 | 6,76,150 | 6,76,150 | 6,76,150 |
| Total Cost | 2,12,11,650 | 6,76,150 | 6,76,150 | 6,76,150 | 6,76,150 |
| Benefit | 96,16,065 | 96,16,065 | 96,16,065 | 96,16,065 | 1,98,83,815 |
| Depreciated value of buildings @ 10% | | | | | 2,54,985 |
| Depreciated value of Machinery & equipments @ 15% | | | | | 77,13,000 |
| Total Benefit | 96,16,065 | 96,16,065 | 96,16,065 | 96,16,065 | 2,78,51,800 |
| Net Benefit | -1,15,95,585 | 89,39,915 | 89,39,915 | 89,39,915 | 2,71,75,650 |
| Discounting Factor@ 15% | 0.87 | 0.76 | 0.66 | 0.57 | 0.50 |
| NPV cost at 15% DF | 1,84,54,136 | 5,13,874 | 4,46,259 | 3,85,406 | 3,38,075 |
| NPV benefits at 15% DF | 83,65,977 | 73,08,209 | 63,46,603 | 54,81,157 | 99,41,908 |
| NPW at 15% DF | 1,73,06,104 | | | | |
| BCR at 15% DF | 1.86 :1 | | | | |
| IRR % | 54.72 | | | | |

G. Term Loan Repayment

Rate of interest - % per annum : 12

Opening balance of term loan : 1,54,01,625

| Year | Loan Outstanding | Gross Surplus | Principal | Interest | Total Repayment | Net Surplus | DSCR |
|------|------------------|---------------|-----------|----------|-----------------|-------------|------|
| 1 | 1,54,01,625 | 89,39,915 | 3080325 | 1848195 | 4928520 | 40,11,395 | 1.8 |
| 2 | 1,23,21,300 | 89,39,915 | 3080325 | 1478556 | 4558881 | 43,81,034 | 2.0 |
| 3 | 92,40,975 | 89,39,915 | 3080325 | 1108917 | 4189242 | 47,50,673 | 2.1 |
| 4 | 61,60,650 | 89,39,915 | 3080325 | 739278 | 3819603 | 51,20,312 | 2.3 |
| 5 | 30,80,325 | 1,92,07,665 | 3080325 | 369639 | 3449964 | 1,57,57,701 | 5.6 |
| | | | | | | Avg. DSCR | 2.8 |